REMARKS

Claim 1 stands rejected under § 112. To overcome this rejection, claim 1 has been amended to recite that the rail-shaped magnetic substance is in the stator. "Relatively" has been deleted, and "centrally" has also been deleted. Reconsideration and withdrawal of this rejection is requested.

Claim 2 stands rejected under § 112. To overcome this rejection, claim 2 has been amended to recite that the coil is located around the magnetic piece, and that current flowing through the coil can make the periodic magnetic change described in the claim. Withdrawal is requested.

Claims 3-22 stand rejected under § 112. To overcome this rejection, claim 3 has been amended by inserting "facing" after the word "piece", as suggested. Claim 5 has been amended by deleting "one-to-one", and claims 6-9 (sic, 8) have been amended to more clearly recite that the core is made of a strong magnetic substance. Withdrawal is requested.

The objection to claim 2 has been overcome by changing "periodical" to "periodic".

Claim 1 stands rejected under § 102 on the basis of Inasumi. Applicant traverses this rejection because Inasumi does not disclose (or suggest), a stator coil that is longer than a mover, the mover not having a coil, as in amended claim 1.

Any linear motor has two basic components, one containing a coiled element and the other not containing a coiled element. Inasumi describes linear motors that have these two basic components. However, the component that does not contain a coiled element has a shape which is longer than the length of its counterpart, a coiled element, measured with respect to the length measured in a movable direction. Any linear motor, as long as it adopts this structure, is bound to have a heavy and large mover if the mover does not contain a coiled element and the stator contains a

coiled element.

According to the present invention, in contrast, the movable direction length of the component that does not contain a coiled element is shorter than the component containing a coiled element. As a result, the device can be made lighter and smaller than those having the structure described in Inasumi. This feature of the present invention leads to the following benefits: (a) the mover can achieve a higher acceleration rate of movement; (b) energy consumption is less; (c) the mover's response to a motion controlling instruction is quicker, and (d) support structure strength can be reduced.

The linear motor described in Inasumi has a structure according to which a mover moves above a stator that constitutes the magnetic flux generating side containing a coiled element. With this structure, the linear motor will become uncontrollable if the effective length of interaction between the mover and stator in phase A is not equal to that in phase B and the requisite balance between phases A and B is lost. In order to avoid losing control of the linear motor, according to Inasumi, the entire face of the stator is covered by the mover when they are in any state in terms of phase. This implies that, differently from the present invention, the linear motor of Inasumi, in no event, can have a structure in which the length of a stator that contains a coiled element becomes longer than the length of a mover that does not contain a coiled element.

It is always necessary for the linear motor of Inasumi to extend the entire length of the mover when extending the travel distance of the mover. It is, therefore, inevitable that the mover, when extending the associated travel distance, becomes heavier and more energy consuming. In contrast, according to the present invention, it is possible to extend the associated travel distance by having a longer stator. In this way, the travel distance becomes extendable without a cost of wasted

energy increase. Withdrawal of this rejection is requested.

Claim 2 stands rejected under § 103 on the basis of Nihei et al. and Maeda et al. Applicant traverses this rejection because neither reference discloses or suggests a first component coil that is longer than the second component, which does not have a coil, as in amended claim 2.

One objective of Nihei is to provide a permanent magnetic type linear pulse motor, which is able to cancel the magnetic pull force generated between the stator and the movers thereof, prevent increasing of the friction force accompanying the magnetic pull force, and prevent up and down vibration in a vertical line of the movers, which is capable of high speed movement and highly accurate positioning. For achieving this objective, a linear type pulse motor is comprised of a yoke having a plurality of the magnetic poles of a permanent magnet alternatively disposed thereon. The plurality of magnetic poles are disposed in a same pitch along the longitudinal direction of at least a first and second surface of the yoke. "A" phase magnetic poles have teeth of the same pitch as the magnetized pitch T of the permanent magnet and wind the same phase coils on a pair of magnetic poles holding a predetermined distance to both surfaces of the magnetic poles of the yoke. "B" phase magnetic poles have the same structure as the A phase magnetic poles and wind same phase coils on a pair of magnetic poles as with the A phase magnetic poles. The A phase magnetic poles and B phase magnetic poles have delay of T/2 pitch relative to the magnetized pitch T of the magnetic poles of the yoke.

Maeda is concerned with a stator structure in which a magnet core unit, a yoke unit and a magnetic pole array are combined into a monolithic unit component so that the number of associated parts becomes one. As a result, associated productivity improves, associated production costs are reduced and, in addition, magnetic energy efficiency improves as a magnetic flux leakage

problem is overcome because no joint of parts remains within the stator. Neither reference discloses a stator coil that is longer than the mover, the mover not having a coil, as in claim 2. Accordingly, withdrawal of this rejection is requested.

Claims 3, 6, 9 and 12 stand rejected under § 103 on the basis of Nihei et al. and Miwa. Applicant traverses this rejection because neither reference, alone or in combination, discloses or suggests a stator coil that is longer than the mover, the mover not having a coil, as in amended claim 3.

Nihei et al. has been discussed. Miwa et al. is concerned with a linear pulse motor, which comprises four magnetic pole components, each shaped into a flat piece of plate having head and leg areas and aligned so as to have all four head areas meet with each other. Tooth units are disposed on a flat face of each head area of all the magnetic pole components. The tooth units align with a constant distance interval in a direction along which a mover of the linear pulse motor is driven, and an array of the tooth units is positioned with a deviation by a quarter of an associated alignment pitch relative to an array of tooth units formed on a scale component. Magnetic flux generation coil units are disposed for each pair of the magnetic pole components aligning at the same side of a path along which the mover is driven at a position from which a generated magnetic flux flows into both the leg areas of the magnetic pole component pair. A permanent magnet is disposed between the two pairs of the magnetic pole components so that one of the associated magnetic pole components so that one of the associated magnetic pole faces one magnetic pole component pair and the other magnetic pole faces the other magnetic pole component pair.

A scale component has a pair of arrays of tooth units on a side of the scale component. The side facing the tooth unit arrays is disposed on the magnetic pole components, at

such positions that the tooth units of each tooth unit array of the pair are aligned with the same constant distance interval to that of the tooth unit array on the magnetic pole components, with a deviation of a quarter of the associated alignment pitch relative to an array of tooth units formed on the magnetic pole components.

A guide guides the mover of the linear pulse motor in the pre-assigned direction, keeping a space of a fixed distance between the scale component tooth units and the magnetic pole component tooth units. Thus, neither reference discloses a stator coil that is longer than the mover, the mover not having a coil. Accordingly, withdrawal of the rejection of independent claim 3 is respectfully requested. Withdrawal of the rejection of claims 6, 9 and 12 is also requested, for the reasons given with respect to claim 3, and because of the additional features recited in those claims.

Claims 4, 7 and 10 stand rejected under § 103 in paragraph 6 of the office action. Applicant traverses this rejection for the reasons given with respect to independent claim 3, and on the basis of the additional features recited in the rejected claims. Withdrawal is requested.

Claim 5 stands rejected under § 103 on the basis of Ota and Onodera. Applicant traverses this rejection because neither reference discloses or suggests a stator coil that is longer than the mover, the mover not having a coil, as in amended claim 5. Ota discloses a flat-plate-shape linear pulse motor, which has a flat plate stator and a movable element disposed away from the flat plate stator by a predetermined distance gap. The stator is composed of flat and E shaped yokes. Magnetic-flux-generating coils wind three legs of each yoke respectively and teeth-like arrays of magnetic poles are provided on an upper face of the yoke. Electric currents, respectively different in a phase, are fed to the teeth-like arrays. The movable element, on the other hand, has magnetic pole teeth-like arrays in which the aligning pitch are the same as that of the stator. According to this

invention, the permanent magnet is not required in the stator units, thus no leakage of permanent magnet origin magnetic flux occurs. Hence, the cause of adversely influencing a magnet head is eliminated.

Onodera is concerned with a linear motor constituted by a mover and a way. The mover has a plurality of iron cores having a body part, and a number of magnetic field legs. A group of tooth-form magnetic poles aligning with a pre-assigned pitch P are disposed on each of the legs. A permanent magnet exerts bias magnetic flux to the plurality of iron cores and coils for generating magnetic fluxes for magnetizing the magnetic field legs. The way located to face the mover keeps a pre-assigned distance between the way and the mover and is constituted by an array of tooth-like magnetic poles of which the pre-assigned pitch is set to P. The array extends in a direction along which the mover moves. With respect to construction of the mover, the permanent magnet is located at a position between the body parts of the plurality of iron cores and further between a pair of neighboring magnetic field legs each belonging to a different iron, in a manner so that the direction of magnetic flux exerted in all the neighboring iron cores becomes the same. Thus, neither reference discloses or suggests a stator coil that is longer than the mover, the mover not having a coil, as in amended claim 5. Reconsideration and withdrawal of this rejection is requested.

Claim 8 stands rejected under § 103 in paragraph 8 of the office action. Applicant traverses this rejection for the reasons given with respect to claim 5, and on the basis of the additional features recited in claim 8. Withdrawal is requested.

For the foregoing reasons, applicant believes that this case is in condition for allowance, which is respectfully requested. The examiner should call applicant's attorney if an interview would expedite prosecution.

Respectfully submitted,

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